



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/791,538	03/03/2004	Takashi Suda	Q79638	3357

23373 7590 04/19/2006
SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
SUITE 800
WASHINGTON, DC 20037

EXAMINER

KAYRISH, MATTHEW

ART UNIT	PAPER NUMBER
----------	--------------

2627

DATE MAILED: 04/19/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/791,538	SUDA, TAKASHI	
	Examiner	Art Unit	
	Matthew G. Kayrish	2627	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-3 are rejected under 35 U.S.C. 102(b) as being anticipated by Chaug et al. (US Patent Number 5930086).
3. Regarding claim 1, Chaug et al disclose:

A magnetic head comprising a film comprised of diamond-like carbon (figure 3, item 24) (hereinafter, referred to as "diamond-like carbon film") between a substrate (figure 3, item 12) and an insulating layer (figure 3, item 14).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Official Notice is taken regarding claim 2 as being unpatentable over Chaug.
6. Regarding claim 2, Chaug et al disclose:

The magnetic head according to claim 1, wherein said film has a Vickers hardness equal to or greater than 2000 kg/mm² (column 4, lines 10-13).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have, in the course of routine engineering optimization/experimentation, to fabricate a magnetic head with corresponding layers within the given ranges. Moreover, absent a showing of criticality, i.e., unobvious or unexpected results, the relationships set forth in claims 11-18 are considered to be within the level of ordinary skill in the art.

Additionally, the law is replete with cases in which the mere difference between the claimed invention and the prior art is some range, variable or other dimensional limitation within the claims, patentability cannot be found.

It furthermore has been held in such a situation, the applicant must show that the particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range(s); see *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Moreover, the instant disclosure does not set forth evidence ascribing unexpected results due to the claimed dimensions; see *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338 (Fed. Cir. 1984), which held that the dimensional limitations failed to point out a feature which performed and operated any differently from the prior art.

7. Official Notice is taken regarding claims 3, 11-18 and 25-31 as being unpatentable over Chaug et al, in view of David et al (US Patent Number 5609948).

8. Regarding claims 3, 11-18 and 25-31, these ranges are well known in the art as common ranges for thicknesses of the layers of a magnetic head.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have, in the course of routine engineering optimization/experimentation, to fabricate a magnetic head with corresponding layers within the given ranges. Moreover, absent a showing of criticality, i.e., unobvious or unexpected results, the relationships set forth in claims 11-18 are considered to be within the level of ordinary skill in the art.

Additionally, the law is replete with cases in which the mere difference between the claimed invention and the prior art is some range, variable or other dimensional limitation within the claims, patentability cannot be found.

It furthermore has been held in such a situation, the applicant must show that the particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range(s); see *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Moreover, the instant disclosure does not set forth evidence ascribing unexpected results due to the claimed dimensions; see *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338 (Fed. Cir. 1984), which held that the dimensional limitations failed to point out a feature which performed and operated any differently from the prior art.

9. Claims 4-7 and 10-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chaug et al, in view of David et al.

10. Regarding claim 4, Chaug et al fails to disclose:

The magnetic head according to claim 1, wherein said magnetic head is a magnetoresistive head.

David et al disclose:

The magnetic head according to claim 1, wherein said magnetic head is a magnetoresistive head (column 2, lines 37-41).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to make the electrodes of Chaug's acoustic wave device into MR elements, as this will allow the device to be used for reading magnetic media.

11. Regarding claims 5 and 18, Chaug et al disclose:

The magnetic head according to claim 4, wherein the diamond-like carbon film, (figure 14, item 9) the insulating layer (figure 14, item 41), an upper gap layer (figure 4, item 27) are provided in this order on one side surface of the substrate (figure 14, item 8).

Chaug et al fails to disclose:

The magnetic head according to claim 4, wherein a lower shield layer, a lower gap layer, a magnetoresistive element, an upper shield layer, and a protective layer are provided in this order on one side surface of the substrate.

David et al disclose:

The magnetic head according to claim 4, wherein the insulating layer (figure 5, item 114) comprised of an insulating material (column 3, lines 21-22), a lower shield layer (figure 5, item 116) comprised of a magnetic material (column 5, lines 57-60), a lower gap layer (figure 5, item 118) comprised of a nonmagnetic material (column 5,

lines 27-30), a magnetoresistive element (figure 5, item 120), an upper gap layer (figure 5, item 121) comprised of a nonmagnetic material (column 5, lines 27-30), an upper shield layer (figure 5, item 122) comprised of a magnetic material (column 5, lines 27-30), and a protective layer (figure 5, item 124) comprised of an insulating material (column 5, lines 32-34) are provided in this order on one side surface of the substrate (figure 5, item 112).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to take the MR head of David, and place under his insulating layer (114) a DLC film layer since DLC layers are very hard and will not smear, thus, protecting the layers above it.

12. Regarding claim 6, Chaug et al disclose:

The magnetic head according to claim 5, wherein said substrate is comprised of a nonmagnetic material (column 5, line 55).

13. Regarding claims 7 and 19, Chaug et al fails to disclose:

The magnetic head according to claim 6, wherein said nonmagnetic material is AlTiC ($\text{Al}_2\text{O}_3\text{-TiC}$), $\alpha\text{-Fe}_2\text{O}_3$ ($\alpha\text{-hematite}$), NiO-TiO₂-MgO, TiO₂-CaO, or NiO-MnO.

David et al disclose:

The magnetic head according to claim 6, wherein said nonmagnetic material is AlTiC ($\text{Al}_2\text{O}_3\text{-TiC}$), $\alpha\text{-Fe}_2\text{O}_3$ ($\alpha\text{-hematite}$), NiO-TiO₂-MgO, TiO₂-CaO, or NiO-MnO (column 3, lines 19-21).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to fabricate the substrate of (Al₂O₃-TiC) since this is a very hard material, which will therefore last longer before breaking.

14. Regarding claim 20, Chaug et al disclose:

The magnetic head according to claim 18, wherein said insulating layer is comprised of alumina (Al₂O₃), silica (SiO₂), AlN, Al--N--X (where X denotes one or more of Si, B, Cr, Ti, Ta and Nb), SiN, SiC, DLC, BN, MgO, SiAlON, ALON, Si₃Na, SiCO, SiON, or SiCON (column 11, lines 35-36).

15. Regarding claim 21, Chaug et al fail to disclose:

The magnetic head according to claim 18, wherein said lower shield layer and said upper lower shield layer are respectively comprised of Fe--Si--Al alloy (Sendust), Ni--Fe alloy (Permalloy), or Ni--Zn alloy (hematite).

David et al disclose:

The magnetic head according to claim 18, wherein said lower shield layer and said upper lower shield layer are respectively comprised of Fe-Si-Al alloy (Sendust), Ni-Fe alloy (Permalloy), or Ni-Zn alloy (hematite) (column 5, lines 57-60).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to fabricate the magnetic shields of these materials because they soft yet magnetic so as to help guide the magnetic flux around the MR sensor.

16. Regarding claim 22, Chaug et al disclose:

The magnetic head according to claim 18, wherein said lower gap layer and said upper gap layer are respectively comprised of alumina (Al_2O_3) or silica (SiO_2) (column 6, lines 9-11).

17. Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chaug et al, in view of David et al, in further view of Postma (US Patent Number 5764453).
18. Regarding claims 8 and 9, Chaug et al, in view of David et al fail to disclose:

The magnetic head according to claim 5, wherein said substrate is comprised of a magnetic material (column 3, lines 7-10).

Wherein said magnetic material is NiZn ferrite or MnZn ferrite (column 3, lines 7-10).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to fabricate the substrate out of a magnetic material, since this will help the substrate to guide the magnetic flux.

19. Claims 10 and 23 is are rejected under 35 U.S.C. 103(a) as being unpatentable over Chaug et al, in view of David et al, in further view of Lau (US Publication Number 2003/0214745), in even further view of Xue et al, (US Patent Number 6144534).
20. Regarding claims 10 and 23, Chaug et al, in view of David et al fail to disclose:

The magnetic head according to claim 5, wherein said magnetoresistive element is a magnetoresistive element comprising a lower layer in the form of a tantalum layer, a SAL bias layer in the form of a NiFeNb layer, an intermediate insulating layer in the

form of a tantalum layer, a magnetoresistive layer in the form of a NiFe layer, and an upper layer in the form of a tantalum layer in this order.

Lau discloses:

The magnetic head according to claim 5, wherein said magnetoresistive element is a magnetoresistive element (page 6, paragraph 40) comprising a lower layer in the form of a tantalum layer (figure 6, item 650), a SAL bias layer (figure 6, item 640), an intermediate insulating layer in the form of a tantalum layer (figure 6, item 630), a magnetoresistive layer in the form of a NiFe layer (figure 6, item 620), and an upper layer in the form of a tantalum layer in this order (figure 6, item 610).

Lau fails to disclose:

A SAL bias layer in the form of a NiFeNb layer.

Lau et al. discloses:

A SAL bias layer in the form of a NiFeNb layer (column 4, lines 64-67).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to create this make up of an MR sensor, as this is a very good thermosensor for repeatability, accuracy and linearity.

21. Claim 24 is are rejected under 35 U.S.C. 103(a) as being unpatentable over Chaug et al, in view of David et al, in further view of Terunuma (US Publication Number 2003/020294).

22. Regarding claim 24, Chaug et al, in view of David et al fail to disclose:

The magnetic head according to claim 18, wherein said protective layer is comprised of alumina (Al_2O_3) or silica (SiO_2).

Terunuma discloses:

The magnetic head according to claim 18, wherein said protective layer is comprised of alumina (Al_2O_3) or silica (SiO_2) (page 6, paragraph 103).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to create the protective layer (in this case, the write gap serves the same purpose of the protective layer) of these materials to provide for the insulating effects to prevent external magnetic field influence.

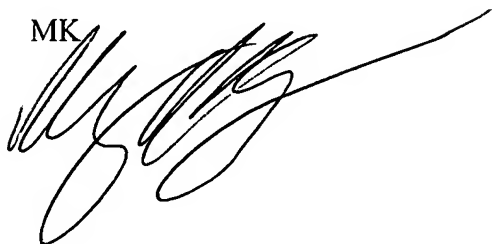
23. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew G. Kayrish whose telephone number is 571-272-4220. The examiner can normally be reached on 8am - 5pm M-F.
24. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William Korzuch can be reached on 571-272-7589. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.
25. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Application/Control Number: 10/791,538

Page 11

Art Unit: 2627

MK

A large, stylized handwritten signature in black ink, possibly reading 'MK' or similar, with a long horizontal stroke extending to the right.

4/11/2006

A handwritten signature in black ink that reads 'Angel Castro C'.

ANGEL CASTRO
PRIMARY EXAMINER